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10/531,763	07/27/2006	Susan D. Strothers	H0004599.69957 USA -4015	3936

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EXAMINER	
BERMAN, JASON	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/531,763	STROTHERS ET AL.	
	Examiner	Art Unit	
	Jason M. Berman	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *3/3/10*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/13/10*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of the Claims

Claims 1-45 are pending in the current application.

Response to Amendment

Applicant's amendment of 3/3/10 does not render the application allowable.

Status of the Rejections

All rejections from the previous office action are maintained.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Sato (JP 06025839 A, as cited in IDS).

As to claim 1, Sato discloses a sputtering target comprising:

- A target surface component comprising a target material (figure 1: target 88);

- A core backing component having a coupling surface and a back surface, wherein the coupling surface is coupled to the target surface component (figure 1: backing plate 190 of target 88);
- At least one surface area feature coupled to or located in the back surface of the core backing component, wherein the surface area feature increases the effective surface area of the core backing component (figure 1: showing uneven features 100 in backing plate 190);
- All of the effective surface area of the core backing component is in contact with a cooling fluid (figures 1 and 13: showing refrigerant 92 flowing along entire back surface of backing plate 190); and
- Wherein the core backing component comprises a center cooling design (figure 1: backing plate 190 cooled along its entirety by fluid 92, and in turn cools entirety, including the center, of target 88).

As to claims 2, 3 and 4, Sato discloses the target material comprises titanium or zinc (paragraph 26: list of potentially sputtered protective films, including ZnO and TiN).

As to claim 5, Sato discloses the feature comprises concave and convex features (figures 1 and 13: showing back surface of plate 190; paragraph 15).

As to claim 6, Sato discloses the concave feature comprises at least on concentric indentation (figure 3A: showing concave channels including squared concentric rings).

As to claim 7, Sato discloses the concave feature comprises a dimple (figures 2 and 13: showing dimpled back surface of plate 190).

As to claim 8, Sato discloses the concave feature comprises a plurality of linear channels (figure 3A grid of channels; figure 3B channels 100b).

As to claim 9, Sato discloses the convex feature comprises a plurality of linear ridges (figure 3B: ridges 100a).

As to claim 10, Sato discloses the convex feature comprises a bump (figure 3A: convex bumps 100a; figure 2: convex bumps 100a).

As to claim 11, Sato discloses the convex feature comprises at least one concentric protrusion (figure 3a showing concentric square areas 100a).

As to claim 12, Sato discloses a sputtering target comprising:

- A target surface component comprising a target material (figure 1: target 88);
- A core backing component having a coupling surface and a back surface, wherein the coupling surface is coupled to the target surface component (figure 1: backing plate 190 of target 88);
- At least one surface area feature coupled to or located in the back surface of the core backing component, wherein the surface area feature comprises a subtractive feature or additive feature which increases the surface area of the core backing component (figure 2: grooves 100b and ridges 100a in backing plate 190);

- All of the effective surface area of the core backing component is in contact with a cooling fluid (figures 1 and 13: showing refrigerant 92 flowing along entire back surface of backing plate 190); and
- Wherein the core backing component comprises a center cooling design (figure 1: backing plate 190 cooled along its entirety by fluid 92, and in turn cools entirety, including the center, of target 88).

As to claims 13, 14 and 15, Sato discloses the target material comprises titanium or zinc (paragraph 26: list of potentially sputtered protective films, including ZnO and TiN).

As to claim 16, Sato discloses the subtractive feature comprises at least on concentric indentation (figure 3A: showing concave channels including squared concentric rings).

As to claim 17, Sato discloses the subtractive feature comprises a dimple (figures 2 and 13: showing dimpled back surface of plate 190).

As to claim 18, Sato discloses the subtractive feature comprises a plurality of linear channels (figure 3A grid of channels; figure 3B channels 100b).

As to claim 19, Sato discloses the additive feature comprises a plurality of linear ridges (figure 3B: ridges 100a).

As to claim 20, Sato discloses the additive feature comprises a bump (figure 3A: convex bumps 100a; figure 2: convex bumps 100a).

As to claim 21, Sato discloses the convex feature comprises at least one concentric protrusion (figure 3a showing concentric square areas 100a).

As to claim 22, Sato discloses a method of forming a sputtering target comprising:

- Providing a target surface component comprising a surface material (figure 1: target 88);
- Providing a core backing component comprising a backing material and having a coupling surface and a back surface (figure 1: backing plate 190);
- Providing at least one surface area feature coupled to or located in the back surface of the core backing component, wherein the surface area feature increases the effective surface area of the core backing component, wherein the surface area feature increases the effective surface area of the core backing component (figure 2: showing concave and convex nature of backing plate 190);
- All of the effective surface area of the core backing component is in contact with a cooling fluid (figures 1 and 13: showing refrigerant 92 flowing along entire back surface of backing plate 190);
- Coupling the surface target component to the coupling surface of the core backing component (machine translation paragraph 40: attachment of target and backing plate); and
- Wherein the core backing component comprises a center cooling design (figure 1: backing plate 190 cooled along its entirety by fluid 92, and in turn cools entirety, including the center, of target 88).

As to claim 23, Sato discloses a method of forming a sputtering target comprising:

- Providing a target surface component comprising a surface material (figure 1: target 88);
- Providing a core backing component comprising a backing material and having a coupling surface and a back surface (figure 1: backing plate 190);
- Providing at least one surface area feature coupled to or located in the coupling surface of the core backing component, wherein the surface area feature increases the effective surface area of the core backing component (figure 10: showing interlocking connection between target and backing plate);
- All of the effective surface area of the core backing component is in contact with a cooling fluid (figures 1 and 13: showing refrigerant 92 flowing along entire back surface of backing plate 190);
- Coupling the surface target component to the coupling surface of the core backing component (machine translation paragraph 40: attachment of target and backing plate); and
- Wherein the core backing component comprises a center cooling design (figure 1: backing plate 190 cooled along its entirety by fluid 92, and in turn cools entirety, including the center, of target 88).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 24-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato in view of Demaray (US 5,433,835).

As to claim 24, Sato discloses a sputtering target comprising:

- An integrated target surface component and core backing component (figure 1: target 88 and backing plate 190; machine translation paragraph 40: attachment of target and backing plate)
- At least one surface area feature on the backing component which increases the effective component of the core backing component (figure 2: showing concave and convex nature of backing plate 190);

- All of the effective surface area of the core backing component is in contact with cooling fluid (figures 1 and 13: showing refrigerant 92 flowing along entire back surface of backing plate 190); and
- Wherein the core backing component comprises a center cooling design (figure 1: backing plate 190 cooled along its entirety by fluid 92, and in turn cools entirety, including the center, of target 88).

Sato is silent as to the target and backing being integrated and comprising the same material.

Demaray discloses a target and backing plate assembly (abstract) in which the backing plate has a surface area increasing feature and is exposed to a cooling fluid (figure 10c: target 86 with backing plate 87 having cooling channels 108). Demaray also discloses the target may be separately bonded materials or a monolithic target and the target and backing may both comprise titanium (abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use an integrated single material target and backing plate, as disclosed by Demaray, in the apparatus of Sato, because a single material monolithic target and backing will avoid cracking from thermal stress (Demaray at abstract).

As to claims 25, 26 and 27, Sato discloses the target material comprises titanium or zinc (paragraph 26: list of potentially sputtered protective films, including ZnO and TiN).

As to claim 28, Sato discloses the feature comprises concave and convex features (figures 1 and 13: showing back surface of plate 190; paragraph 15).

As to claim 29, Sato discloses the concave feature comprises at least on concentric indentation (figure 3A: showing concave channels including squared concentric rings).

As to claim 30, Sato discloses the concave feature comprises a dimple (figures 2 and 13: showing dimpled back surface of plate 190).

As to claim 31, Sato discloses the concave feature comprises a plurality of linear channels (figure 3A grid of channels; figure 3B channels 100b).

As to claim 32, Sato discloses the convex feature comprises a plurality of linear ridges (figure 3B: ridges 100a).

As to claim 33, Sato discloses the convex feature comprises a bump (figure 3A: convex bumps 100a; figure 2: convex bumps 100a).

As to claim 34, Sato discloses the convex feature comprises at least one concentric protrusion (figure 3a showing concentric square areas 100a).

5. Claims 35-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato in view of Mishima (US 5,338,425).

As to claim 35, Sato discloses a sputtering target comprising:

- An integrated target surface component and backing component (figure 1: target 88 and backing plate 190; machine translation paragraph 40: attachment of target and backing plate);
- At least one surface area feature that is located on the core backing component, wherein the feature increases the effective component of the

core backing component (figure 2: showing concave and convex nature of backing plate 190);

- All of the effective surface area of the core backing component is in contact with cooling fluid (figures 1 and 13: showing refrigerant 92 flowing along entire back surface of backing plate 190); and
- Wherein the core backing component comprises a center cooling design (figure 1: backing plate 190 cooled along its entirety by fluid 92, and in turn cools entirety, including the center, of target 88).

Sato is silent as to the target comprising a target material gradient.

Mishima discloses a target and backing plate apparatus (figure 1: target 11 with backing layer 12) in which the target material is a gradient (col 3 lines 24-44). This gradient is disclosed as improving the mechanical strength and bonding with the backing plate during the sputtering operation (col 3 lines 24-44).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a gradient, as disclosed by Mishima, in the apparatus of Sato, because the gradient allows for greater strength and bonding with the backing plate (Mishima at col 3 lines 24-44).

As to claims 36-38 Sato discloses the target material comprises titanium or zinc (paragraph 26: list of potentially sputtered protective films, including ZnO and TiN).

As to claim 39, Sato discloses the feature comprises concave and convex features (figures 1 and 13: showing back surface of plate 190; paragraph 15).

As to claim 40, Sato discloses the concave feature comprises at least on concentric indentation (figure 3A: showing concave channels including squared concentric rings).

As to claim 41, Sato discloses the concave feature comprises a dimple (figures 2 and 13: showing dimpled back surface of plate 190).

As to claim 42, Sato discloses the concave feature comprises a plurality of linear channels (figure 3A grid of channels; figure 3B channels 100b).

As to claim 43, Sato discloses the convex feature comprises a plurality of linear ridges (figure 3B: ridges 100a).

As to claim 44, Sato discloses the convex feature comprises a bump (figure 3A: convex bumps 100a; figure 2: convex bumps 100a).

As to claim 45, Sato discloses the convex feature comprises at least one concentric protrusion (figure 3a showing concentric square areas 100a).

Response to Arguments

6. Applicant argues in the remarks that a center cooling design is where the core backing component is designed such that the cooling fluid can contact the center of the target initially before moving out to other sections of the backing component. This is a very narrow definition of the term “center cooling design” and does not have any support within the specification. The instant specification does not describe or illustrate a center cooling design that would support this definition. The broadest reasonable definition of the term ‘center cooling design’ would incorporate any design which acts to cool the

center of a target. No limitations are present in the claim requiring the flow to contact the center of the target first.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Berman whose telephone number is (571)270-5265. The examiner can normally be reached on M-R 8am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571)272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nam X Nguyen/
Supervisory Patent Examiner, Art Unit 1753

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5/26/2010